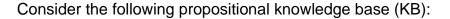
Forward Chaining Example



- 1. $P \Rightarrow Q$
- 2. $L \wedge M \Rightarrow P$
- 3. $B \wedge L \Rightarrow M$
- 4. $A \wedge P \Rightarrow L$
- 5. $A \wedge B \Rightarrow L$
- 6. A
- 7. B

Proof that $KB \models Q$ using **forward chaining**.

The proof is done as follows:

- The propositions (6) and (7) satisfies the condition of (5) resulting in (8) L when using modus ponens.
- 8. L
- The propositions (7) and (8) satisfies the condition of (3) resulting in (9) M when using modus ponens.
- 9. M
- The propositions (8) and (9) satisfies the condition of (2) resulting in (10) P when using modus ponens.

10.P

- The proposition (10) satisfies the condition of (1) resulting in (11) Q when using modus ponens.
- 11.Q

Since Q is deduced, $KB \models Q$.

The final knowledge base (KB) is:

- 1. $P \Rightarrow Q$
- 2. $L \wedge M \Rightarrow P$
- 3. $B \wedge L \Rightarrow M$
- 4. $A \wedge P \Rightarrow L$
- 5. $A \wedge B \Rightarrow L$
- 6. A
- 7. B
- 8. L
- 9. M
- 10.P
- 11.Q

Backward Chaining Example

Consider the following propositional knowledge base (KB):

- 1. $P \Rightarrow Q$
- 2. $L \wedge M \Rightarrow P$
- 3. $B \wedge L \Rightarrow M$
- 4. $A \wedge P \Rightarrow L$
- 5. $A \wedge B \Rightarrow L$
- 6. A
- 7. B

Proof that $KB \models Q$ using **backward chaining**.

The proof is done as follows:

- To prove KB = Q, it must be proven that P is true according to (1).
- For P to be true, L and M must be true according to (2).
- For L to be true, A and P must be true according to (4).
- Also, for L to be true, A and B must be true according to (5).
- For M to be true, B and L must be true according to (3).
- We know A and B are true according to (6) and (7).

For the rest of the proof, forward chaining is applied as follows:

- The propositions (6) and (7) satisfies the condition of (5) resulting in (8) L when using modus ponens.
- 8. L
- The propositions (7) and (8) satisfies the condition of (3) resulting in (9) M when using modus ponens.

- 9. M
- The propositions (8) and (9) satisfies the condition of (2) resulting in (10) P when using modus ponens.

10.P

• The proposition (10) satisfies the condition of (1) resulting in (11) Q when using modus ponens.

11.Q

Since Q is deduced, $KB \models Q$.

The final knowledge base (KB) is:

- 1. $P \Rightarrow Q$
- 2. $L \wedge M \Rightarrow P$
- 3. $B \wedge L \Rightarrow M$
- 4. $A \land P \Rightarrow L$
- 5. $A \wedge B \Rightarrow L$
- 6. A
- 7. B
- 8. L
- 9. M
- 10.P
- 11.Q